

factors. Environmental factors were found to have a marked influence upon invasion by the parasite (*Fusarium*), there being a "critical soil temperature" (about 17° C.) for such invasion. Below this the plants are not invaded even in the sickest soils.—J. M. C.

Desiccation.—An investigation of the course of desiccation and partial starvation in cacti has been made by MACDOUGAL, LONG, and BROWN.³³ The principal studies center upon the changing rate of water loss, chemical changes in the food reserves, plasmatic colloids and cell sap, and the morphological changes which occur during long periods of desiccation. In one case a large *Echinocactus* was under observation for 6 years after removal of the plant from the soil. Water loss is rather rapid at first, but proceeds more and more slowly with time. While 10 per cent of the water was lost the first year in one specimen, during the sixth year only 5 per cent of the water remaining at the beginning of that year was lost. The loss of water is much more rapid of course in the open than in diffuse light, and *Echinocactus* can withstand desiccation not more than 2 years with free exposure.—GEO. D. FULLER.

Aeration of nutrient solutions.—STILES and JÖRGENSEN³⁴ find that aeration of the nutrient solution increases the rate of growth of barley, as found by various workers, but has no effect on the growth of buckwheat, as found by FREE. They carefully limit their conclusion to the condition under which they experimented, and find themselves unable to explain this specific difference. They emphasize the necessity of knowing much more about the physical chemistry of water culture solutions. They also feel that neither the law of the minimum nor the principle of limiting factors gives an adequate expression of the behavior of the plant as a whole.—WM. CROCKER.

Apogamy in ferns.—STEIL³⁵ has discovered apogamy in a large number of ferns, the investigation extending over a period of 6 years. It seems that apogamy is of frequent occurrence in *Pellaea*, *Pteris*, and *Aspidium*. The prothallia were grown under cultural conditions favorable for the development of sex organs and embryos in non-apogamous species. Many interesting details of embryo development are given, which much extend our knowledge of this phenomenon.—J. M. C.

³³ MACDOUGAL, D. T., LONG, E. R., and BROWN, J. G., End results of desiccation and respiration in succulent plants. *Physiol. Res.* 1:289-325. 1915.

³⁴ STILES, W., and JÖRGENSEN, I., Observations on the influence of aeration of the nutrient solution in water culture experiments, with some remarks on the water culture methods. *New Phytol.* 16:182-197. 1917.

³⁵ STEIL, W. N., Studies of some new cases of apogamy in ferns. *Bull. Torr. Bot. Club* 45:93-108. *pls.* 4, 5. 1918.